

REMARKS

This is a full and timely response to the final Office Action mailed November 8, 2005 (Paper No. 20051107). Reconsideration and allowance of the Application and presently pending claims are respectfully requested.

I. Indication of Allowed Claim

Applicants greatly appreciate the Examiner's statement in this Office Action in which claim 17 has been allowed.

II. Rejection under 35 U.S.C. §112, first paragraph

Claims 1-16 and 18-23 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claims 1 and 15 allegedly contain new matter. Applicants respectfully traverse that claims 1 and 15 contain new matter. Applicants respectfully submit that the features of claims 1 and 15 are supported in paragraphs 68 and 77 of the application.

III. Rejection under 35 U.S.C. §103(a)

Claims 1, 2, 4-6, 8, 9, 11, 15, 16, and 20-23 stand rejected as allegedly being unpatentable over *Kram* in view of *Sidey*. Claims 3, 13, and 14 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Kram* in view of *Sidey* as applied to claim 1, and further in view of *Cooper, et al.*

In order for a claim to be properly rejected under 35 U.S.C. §103, the teachings of the prior art reference must suggest all features of the claimed invention to one of ordinary skill in the art. *See, e.g., In re Dow Chemical*, 837 F.2d 469, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981).

A. Claim 1

Claim 1, as amended, recites:

1. An apparatus for determining *in situ* pore fluid and soil properties, the apparatus comprising:
a penetrating tip member configured to penetrate the soil; and
an attachment module coupled to the penetrating tip member, the attachment module including at least one mandrel, each mandrel including at least one piezo sensor, wherein ***each piezo sensor is capable of obtaining an in situ measurement of pore pressure at a location corresponding proximal to the at least one mandrel on the attachment module, wherein each piezo sensor is capable of obtaining an in situ measurement of pore pressure independently of the penetrating tip member.***

(Emphasis Added)

- i. *Kram* fails to disclose and teach at least the above-emphasized elements, particularly the element of “each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure at a location corresponding proximal to the at least one mandrel on the attachment module, wherein each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure independently of the penetrating tip member,” as recited in claim 1.

In fact, *Kram* appears to disclose “a piezocone for measuring the soil’s resistance to penetration and pore water pressure while being advanced into the ground by a rig.” (*Kram*, Abstract). *Kram* further discloses that “[the] pore water pressure is measured by a porous element mounted in the conical tip of the piezocone and a pressure transducer mounted in the cylindrical friction sleeve of the piezocone.” (*Kram*, Abstract). In short, the *Kram* penetrometer appears to disclose that the conical tip of the piezocone contains sensors that are involved in calculating the pore water pressure. Consequently, Applicants respectfully submit that *Kram* fails to teach or disclose “each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure at a location corresponding proximal to the at least one mandrel on the attachment module, wherein each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure independently of the

penetrating tip member.” (Emphasis Added). Accordingly, Applicants respectfully submit that the rejection be withdrawn and claim 1 be allowed.

- ii. Sidey fails to disclose and teach at least the above-emphasized elements, particularly the element of “each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure at a location corresponding proximal to the at least one mandrel on the attachment module, wherein each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure independently of the penetrating tip member,” as recited in claim 1

In fact, *Sidey* appears to disclose “[a] system for measuring transient pore water pressure in the ground utilizes a probe member having a unique arrangement of a pressure sensor and a soil stress isolation filter.” (*Sidey*, Abstract). *Sidey* further discloses the following.

“The probe member [14] has a body portion with a hollow cavity [104 contained in the probe member’s outer tip end 16]. The pressure sensor [preferably] in the form of a [piezoelectric] ceramic [pressure] transducer is mounted in the cavity, and the filter in the form of a circumferential gap formed on the body communicates with the cavity. The filter is also configured for isolating the sensor from effective soil fabric stresses while allowing access to the transducer by pore water pressure. A coupling medium in the form of silicon grease fills the cavity so as to transmit the pore water pressure to the transducer.”

(*Sidey*, Abstract).

In short, the *Sidey* penetrometer appears to disclose that the outer tip end 16 of the probe member contains a piezo sensor that is involved in calculating the pore water pressure. Consequently, Applicants respectfully submit that *Sidey* fails to teach or disclose “each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure at a location corresponding proximal to the at least one mandrel on the attachment module, wherein each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure independently of the penetrating tip member.” (Emphasis Added). Accordingly, Applicants respectfully submit that the rejection be withdrawn and claim 1 be allowed.

- iii. The combination of *Kram* and *Sidey* fails to disclose, teach, or suggest each and every element of claim 1

Because *Kram* and *Sidey* fail to disclose, teach, or suggest the above-emphasized features of claim 1, Applicants respectfully submit that the combination of *Kram* and *Sidey* also fails to disclose, teach, or suggest each and every element of claim 1. Thus, a *prima facie* case of obviousness is not established based on *Kram* and *Sidey*. Consequently, for at least this reason, among others, Applicants respectfully request that claim 1 be allowed and the rejection be withdrawn.

B. Claim 15

Claim 15, as amended, recites:

15. A method of determining *in situ* pore fluid and soil properties, the method comprising the steps of:
positioning a penetrating tip member so as to penetrate into the soil at a particular subsurface area;
positioning an attachment module in a predetermined relationship to the penetrating tip member to form a penetrometer;
forcing the penetrometer into the soil beginning with the penetrating tip member;
collecting attachment module measurements from at least one piezo sensor coupled to at least one mandrel; and
obtaining an in situ measurement of pore fluid pressure at a depth that corresponds to the location of the at least one mandrel from the at least one piezo sensor, wherein each piezo sensor is capable of obtaining an in situ measurement of pore pressure independently of the penetrating tip member.

(Emphasis Added)

As mentioned above, the *Kram* penetrometer appears to disclose that the conical tip of the piezocone contains sensors that are involved in calculating the pore water pressure and the *Sidey* penetrometer appears to disclose that the probe member's outer tip end 16 contains a piezo sensor that is involved in calculating the pore water pressure. Consequently, Applicants respectfully submit that *Kram* and *Sidey* fail to teach or disclose the feature of "obtaining an *in situ* measurement of pore fluid pressure at a depth

that corresponds to the location of the at least one mandrel from the at least one piezo sensor, wherein each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure independently of the penetrating tip member.” Thus, a *prima facie* case of obviousness is not established based on *Kram* and *Sidey*. Accordingly, for at least this reason, among others, Applicants respectfully submit that the rejection be withdrawn and claim 15 be allowed.

C. Dependent Claims

Because independent claims 1 and 15 are allowable over the cited art of record, dependent claims 2-14 and 16-23 are allowable as a matter of law for at least the reason that dependent claims 2-14 and 16-23 contain all features and elements of their respective independent base claims. *See, e.g., In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). Accordingly, the rejection to dependent claims 2-14 and 16-23 should be withdrawn for at least this reason, among others.

IV. Newly Added Claims 24-27

Claim 24 recites:

24. An apparatus for determining *in situ* pore fluid and soil properties, the apparatus comprising:
a penetrating tip member configured to penetrate the soil; and
an attachment module coupled to the penetrating tip member, the attachment module including at least one mandrel, each mandrel including at least one piezo sensor and a friction sleeve,
wherein a friction sleeve induces an internal shearing of the soil which enables the piezo sensor to measure pore fluid pressure, wherein the at least one piezo sensor measures the pore fluid pressure generated from the penetrating tip member and the friction sleeve.

(Emphasis Added)

Applicants respectfully submit that the cited references of record fail to disclose, teach, or suggest the above-emphasized features. Applicants respectfully request that claim 24 be allowed.

Claims 25, 26, and 27 recite:

25. The apparatus of claim 24, wherein the attachment module includes multiple mandrels, each mandrel having at least one piezo sensor and a friction sleeve configured with a surface texture, the attachment module further comprising a vertical arrangement of the friction sleeves.

26. The apparatus of claim 25, wherein the at least one mandrel comprises a leading mandrel and a trailing mandrel, a leading piezo sensor of the leading mandrel being capable of measuring the pore fluid pressure generated from a leading friction sleeve of the leading mandrel and the penetrating tip member,
wherein a trailing piezo sensor of the trailing mandrel measures the pore fluid pressure generated from a trailing friction sleeve of the trailing mandrel, the leading friction sleeve and the penetrating tip member.

27. The apparatus of claim 26, wherein the measurement of the pore fluid pressure generated from the trailing friction sleeve is calculated by subtracting the measurements of the leading piezo sensor from the trailing piezo sensor.

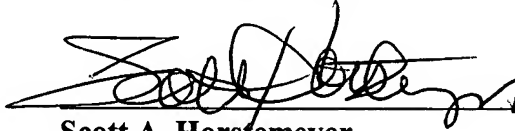
Applicants respectfully submit that the cited references of record fail to disclose, teach, or suggest the features of claims 25-27. Applicants respectfully request that claims 25-27 be allowed.

CONCLUSION

The Applicants respectfully submit that all claims are now in condition for allowance, and request that the Examiner passes this case to issuance. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

No fee is believed to be due in connection with this response. If, however, any fee is deemed to be payable, you are hereby authorized to charge any such fee to Deposit Account No. 20-0778.

Respectfully submitted,



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